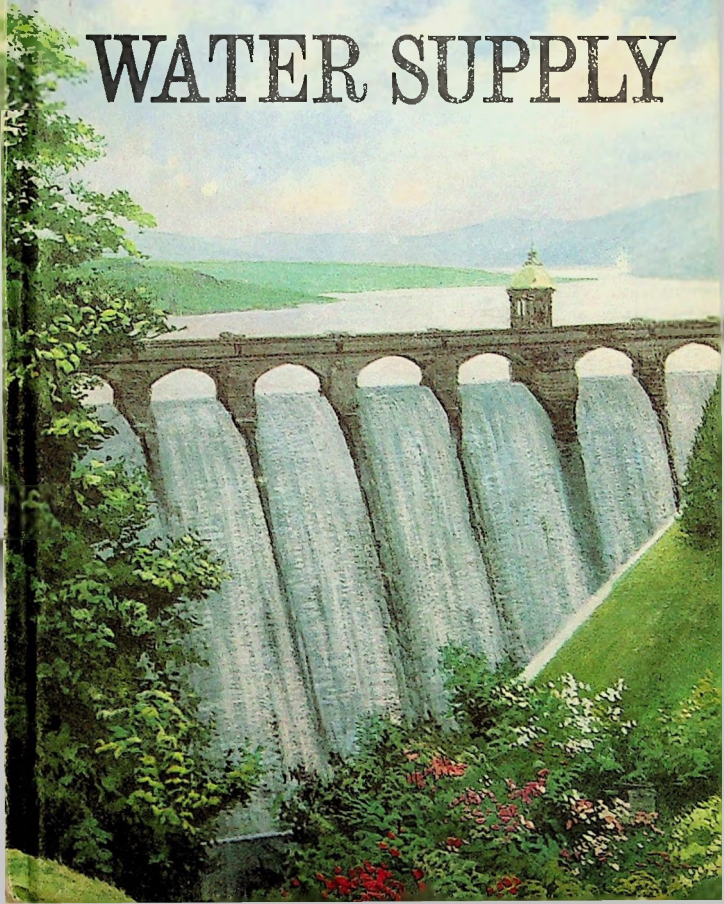


A Ladybird 'Easy-Reading' Book



The Public Services

WATER SUPPLY



As we turn on a water tap few of us realize how many engineering and scientific skills are involved in making sure that we have a regular supply whenever we require it.

With simple, clear text and full-colour illustrations, this book describes the sources of our water supply and how it is brought to our homes and factories.



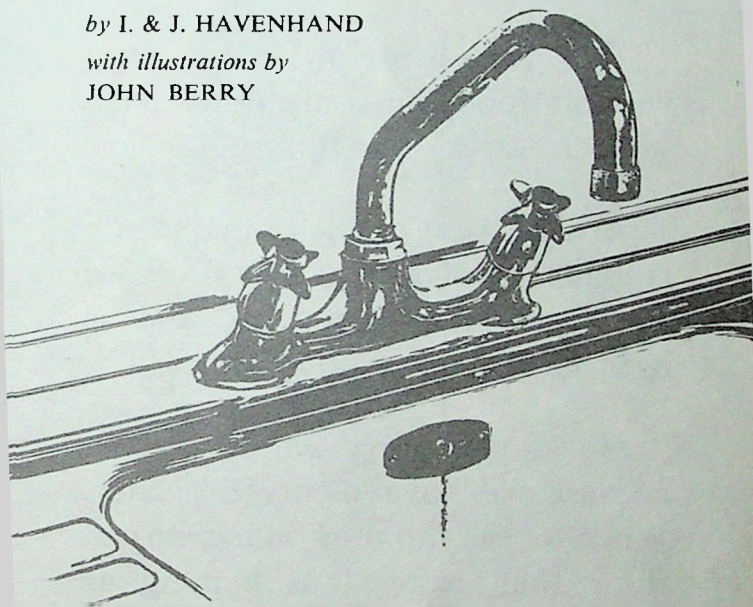
A Ladybird Book
Series 606E

The Public Services WATER SUPPLY

A Ladybird 'Easy-Reading' Book

by I. & J. HAVENHAND

with illustrations by
JOHN BERRY



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SUPPLYING OUR WATER

Of all the things that we must have in order to live, water is one of the most important.

We can live for many days without food, but only if we have water to satisfy our thirst.

A large part of the human body is made up of water. The food we eat needs water to grow, and is itself largely made up of water.

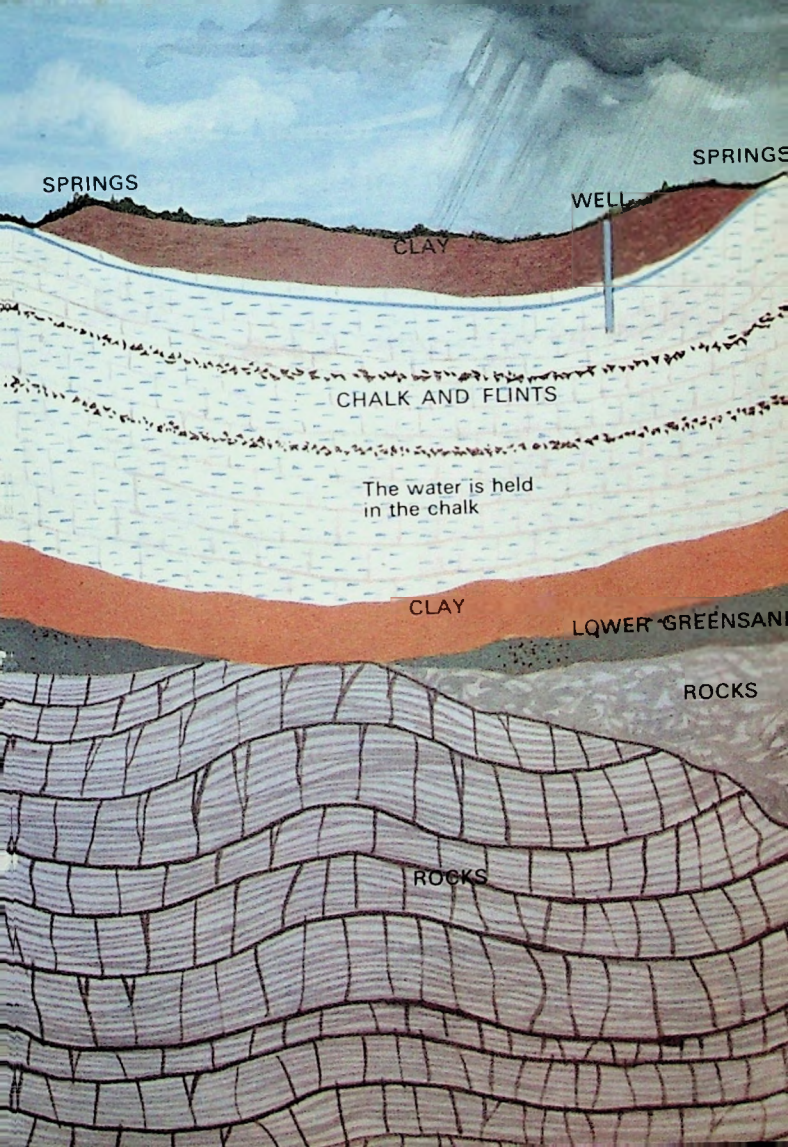
In our country we are lucky because we have plenty of water. When we see the rain falling we can think that, as well as making us wet, some of the rain will eventually reach our water taps.



We get our tap water from rain. Rain soaks into the ground and goes down as far as it can. When it reaches a layer of rock or clay it cannot soak down any further so the water runs along underground. Sometimes this water bubbles out of the side of a hill as a spring.

Many years ago, people who lived near a spring used it for their supply of pure water.

Other people had to dig wells. A well is a hole in the ground, dug at a place where people think there is water.



SPRINGS

SPRINGS

WELL

CLAY

CHALK AND FLINTS

The water is held
in the chalk

CLAY

LOWER GREENSAND

ROCKS

ROCKS

If water was found, the well was lined with bricks or stones. As water was taken out of the well, other water soaked into it, keeping the water-level the same.

There were different ways of getting water out of wells. Sometimes a bucket was tied to a rope. The bucket was dropped into the water and pulled up on the rope. Some people fixed the rope to a roller and turned a handle to pull up the bucket.

Later, simple pumps which sucked up the water through a pipe and out of a spout were made.



As towns grew bigger, many houses did not have a well. People who had no well got their water from public wells or fountains in the streets.

Some people lived a long way from the public wells. They often got their water from water-carriers. These were men who drew water from the wells and took it round to the houses.

Some of the water-carriers carried two wooden buckets which

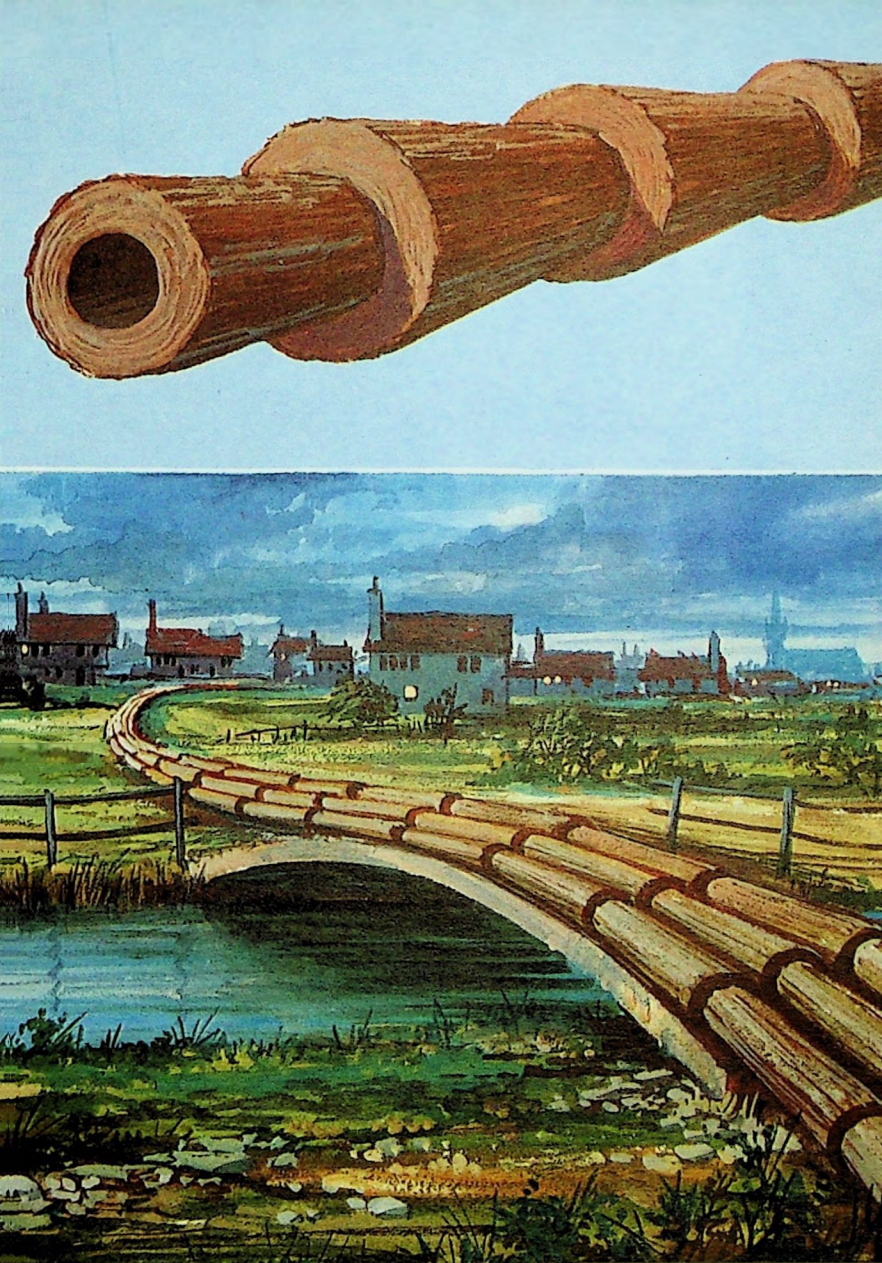


Some years later, water-carts were used. These were large wooden barrels on wheels and were pulled by horses. People filled their buckets from a tap at one end of the barrel.

Still more water was needed for towns, and other ways of taking it round had to be found.

Someone thought of carrying water in pipes. The first pipes were made of wood and were hollow or bored-out tree trunks fitted together. These were later buried underground. Lead pipes were used to take the water into the houses.

Our present-day water supply has grown from these simple pipes.



Towns which stood on the banks of large rivers had plenty of water to use.

People in towns with either no river at all, or with only small rivers, still had to get their water from wells.

Some of the wells were quite deep, and steam-driven pumps were used to draw up the water.

In some parts of the country, the water soaks through into large underground lakes. Where these lakes are found, they provide plenty of water which can be pumped up.



Some people used the wind to work pumps. This saved them having to pump water by hand.

The sails of the wind-pump were built at the top of a tall tower. The sails turned to face the wind. Water could only be pumped on windy days. To make sure that there was always plenty of water for use, large storage tanks were built under the roofs of the houses.

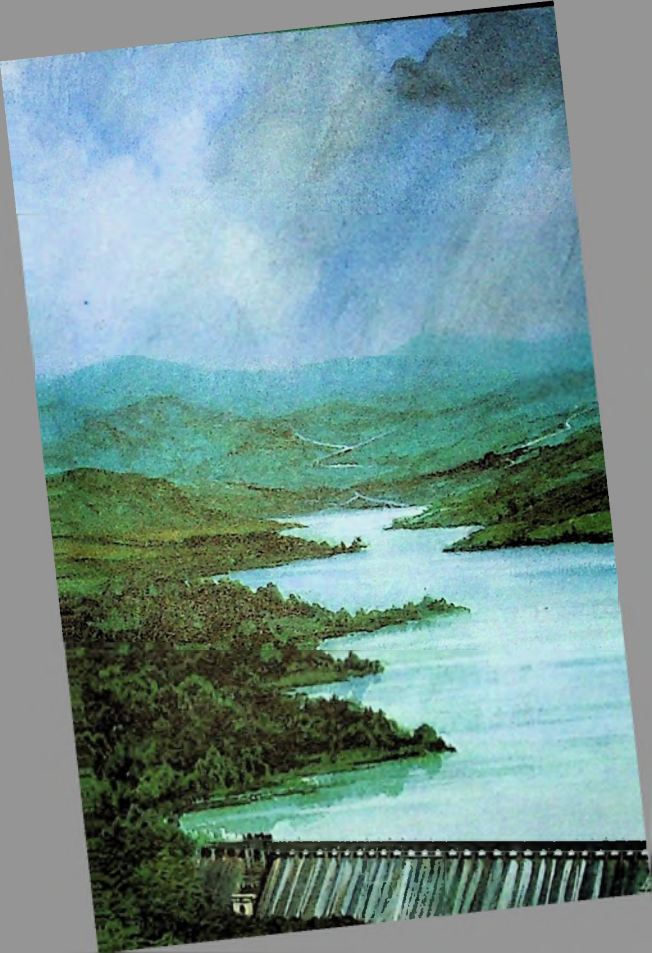
Wind-pumps, like that in the picture, are still used on many farms, with an electric motor to work the pump on days when there is no wind.



Some large cities have made use of all the water that is nearby. New houses are built and so even more water is needed for the people who live in them.

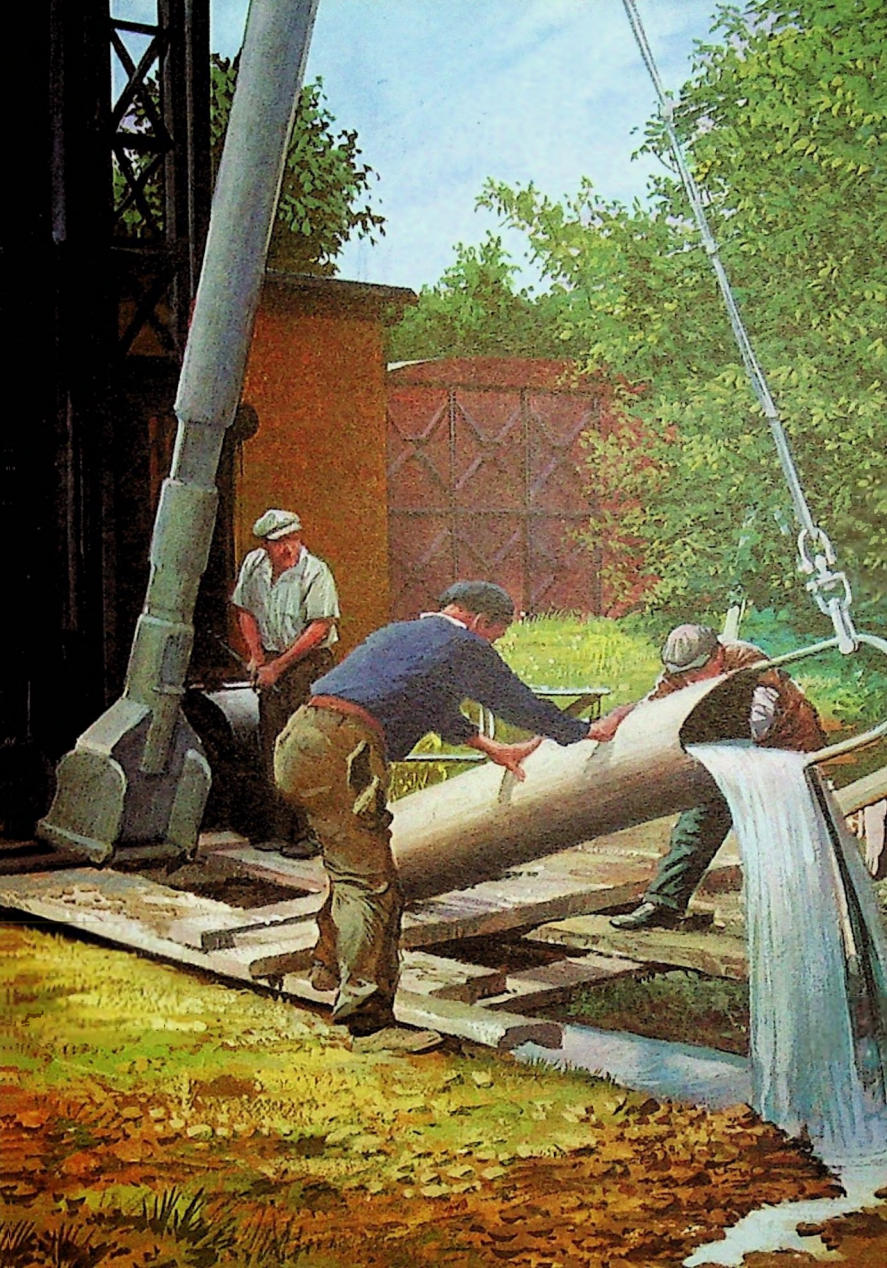
The men at the water department must find more water. To do this, they have to go a long way from the city to the hills and mountains where few people live.

The rain falls on the mountains and runs down them as small streams. The small streams join together and make bigger streams.



Men from the water department like to find a deep valley with a river flowing through it and no large villages in the valley. Such a valley is a good place to build a dam, and is called a 'catchment area'. The dam blocks up the end of the valley and stops the water from flowing away. You can see a dam in the previous picture.

If it is decided to build a dam, a firm of civil engineers is asked to build it. One of the first things they do is to bore holes in the ground, as in the picture, to find firm rock on which to build the dam.



The dam must be very strong. When it is finished, it holds back the river so that the water floods the valley. In this way a reservoir is made which can store millions of gallons of water.

To make a dam strong, it is built into the sides of the mountains and across the bottom of the valley. To do this, earth is scraped away and deep cuts are blasted into the sides of the mountains.

Dams are thick walls of concrete. When they have been built, they are sometimes faced with stone to make them look like part of the countryside.



If a valley with houses in it has to be flooded, the people living in them must move. New houses are built for them on higher ground.

Cities that need water must not build dams, stop rivers flowing and take *all* the water away to the city. This would not be fair to farms, villages and other towns lower down the river which also need water. If the river did not flow, they would have no water.

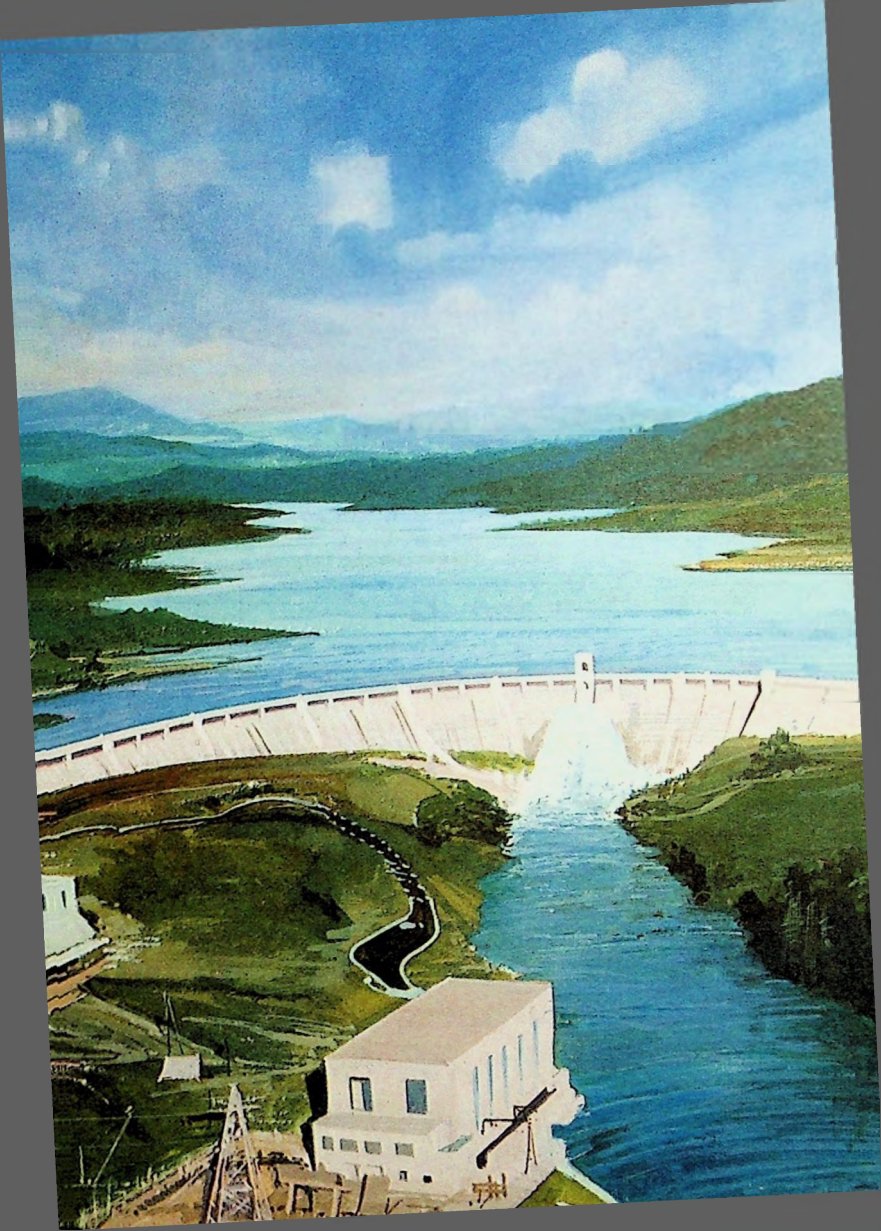
The city that owns the dam must always let some water pass through a 'draw-off tower'. If there is too much rain, surplus water flows down an 'overspill' like that in the picture.



The people of London get a lot of water from the River Thames. It is taken from a long way up the river where the water is clean.

The water for the people of Manchester comes from the Lake District. When lakes are used to supply drinking water, they cannot be used for swimming but boating is sometimes permitted.

In some dams, such as Lady Bower in Derbyshire, fan blades are built into the pipes that carry away the water. The water turns the fan blades, which drive a generator to make electricity. This is called hydro-electric power.



The water engineers of Birmingham have always found it difficult to keep the city supplied with water. Birmingham is not near a large river.

A lot of the water that is used in Birmingham comes from Wales. It is from the mountains where the River Elan and the River Claerwen flow. The valleys have been dammed to make big reservoirs.

In spring, after the wet winter weather there is more water in rivers and streams. By making dams, this water can be saved and used in summer when the weather is drier and more water is needed.



CRAIG-YR-ALLT GOCH
RESERVOIR

DAM

PEN-Y-GAREG
RESERVOIR

DAM

GAREG-DDU
RESERVOIR

DAM

ELAN VILLAGE

CABAN-COCH
RESERVOIR

RIVER
LAKERWEN

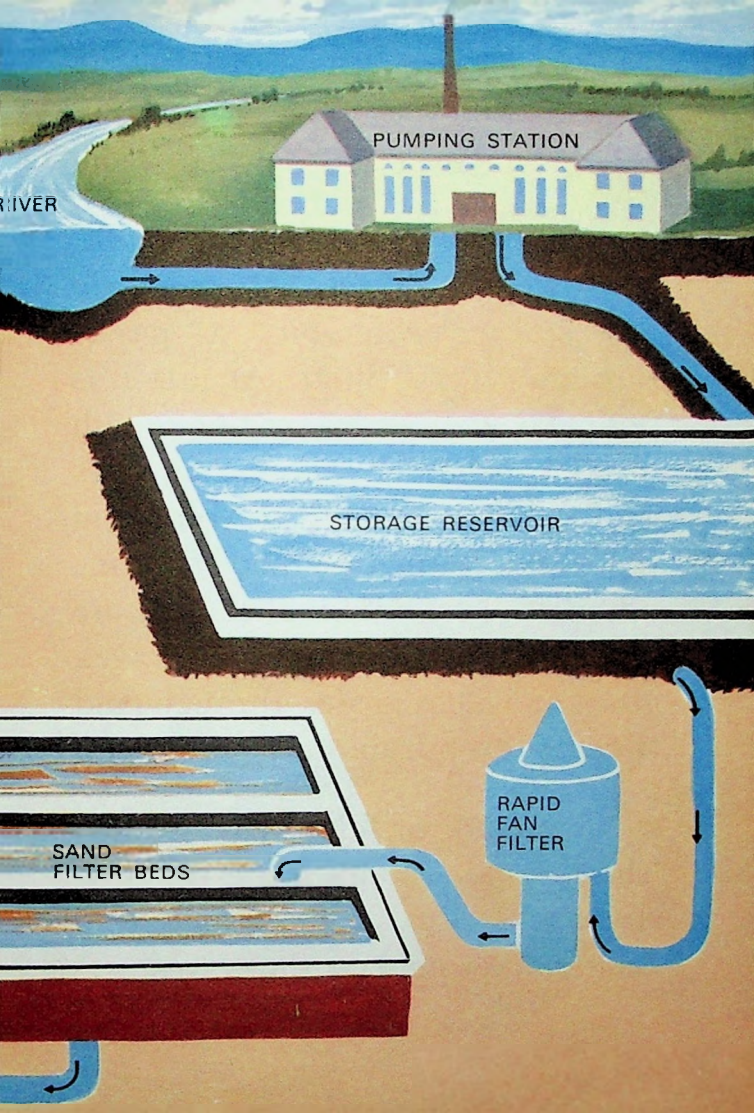
RIVER
ELAN

ROADS

The water is pumped through pipes from the reservoir to the city that owns it. The distance from a dam to a city may be as much as seventy miles.

If the water comes from a distant reservoir or river, it is pumped up, or can flow down, to tanks or storage reservoirs near the cities, towns or villages. The water stands in the storage reservoirs for a while.

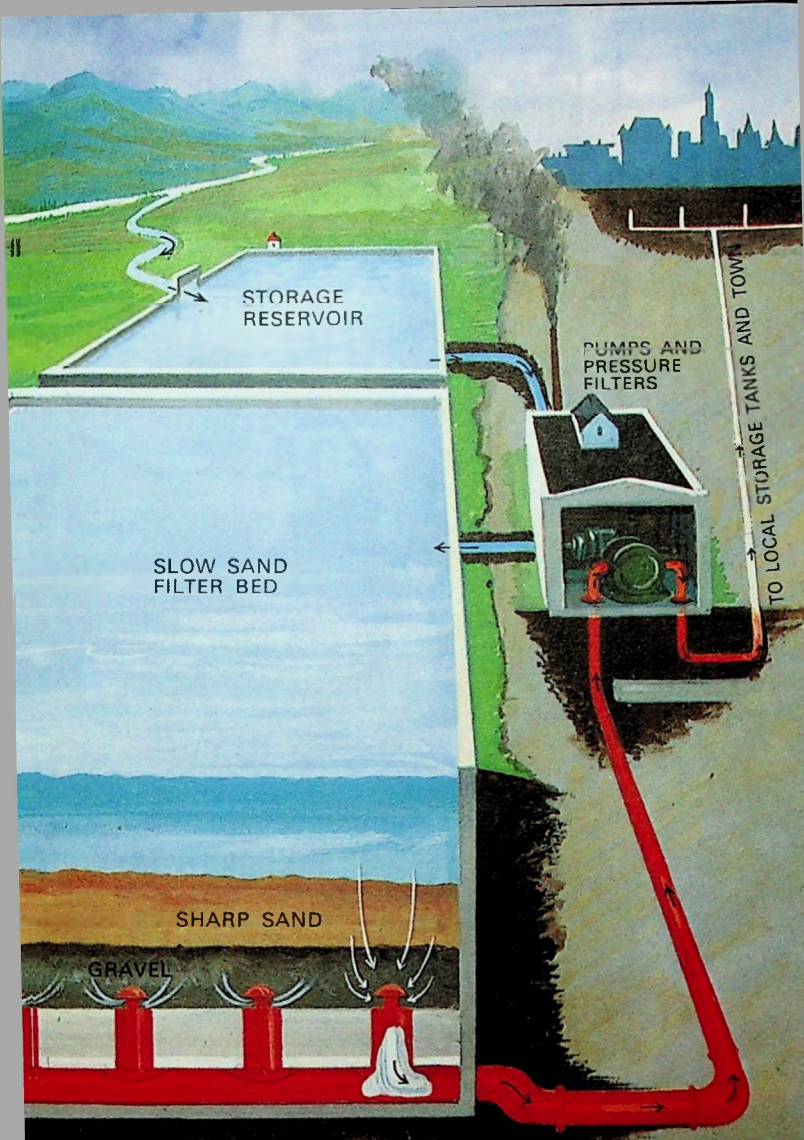
While it is standing, any dirt in the water settles to the bottom. Some germs are killed by sunshine, and the wind helps to take away any nasty taste or smell that the water may have.



The water we drink should be clear, tasteless, free from germs and have no smell.

After the water has stood in the storage reservoir, it passes through several filters. At first it is pumped quickly through fine mesh filters or sand. The water then flows on to slow filter beds, as you see in the previous picture and the one opposite. These slow filter beds are made of layers of sand and gravel, and the water passes through and trickles down drain holes into pipes.

The sand for filter beds is called 'sharp sand'. Sand from the sea-shore is no use, as the grains have been made round by the waves.



When the water leaves the filter bed, it looks clean and clear, but there could still be tiny germs in it, and these could make people ill.

To kill all germs, the water is sterilised. To do this the water is pumped through machines, like those in the picture, which put in a small quantity of chlorine.

The water is kept for a short time in tanks at the waterworks. This gives the chlorine time to work.

At some waterworks a small quantity of fluoride is added to the water. It is thought that this helps to stop decay in the teeth of young children.



In some parts of the country, the water may be hard. Hard water leaves a layer of stony scale in pipes and boilers. It is difficult to wash in hard water, as soap will not lather easily.

In other parts of the country the water may be soft. Soft water attacks metal pipes and wears them away.

If the water is too hard, or too soft, chemicals are added to make it better to use.

At times, small samples of water are taken away. They go to be tested by chemists to make sure that the water is pure.



When the water is fit to drink, it has to be taken to every house. Large electric pumps in the pumping house force the water through a network of pipes under the ground. The pump must not be too powerful, but strong enough to get the water to all parts of the town.

The pipes from the waterworks are very large and are called water mains. Sometimes these pipes lead to covered reservoirs in different parts of the town. These reservoirs are used for storing water at night when there is not much being used.

Parts of some towns are built on hills. Sometimes a storage reservoir is built on a hill top. If there is no room for a reservoir, a large concrete tank is built on girders. These tanks have often been put inside buildings, like the one in the picture.

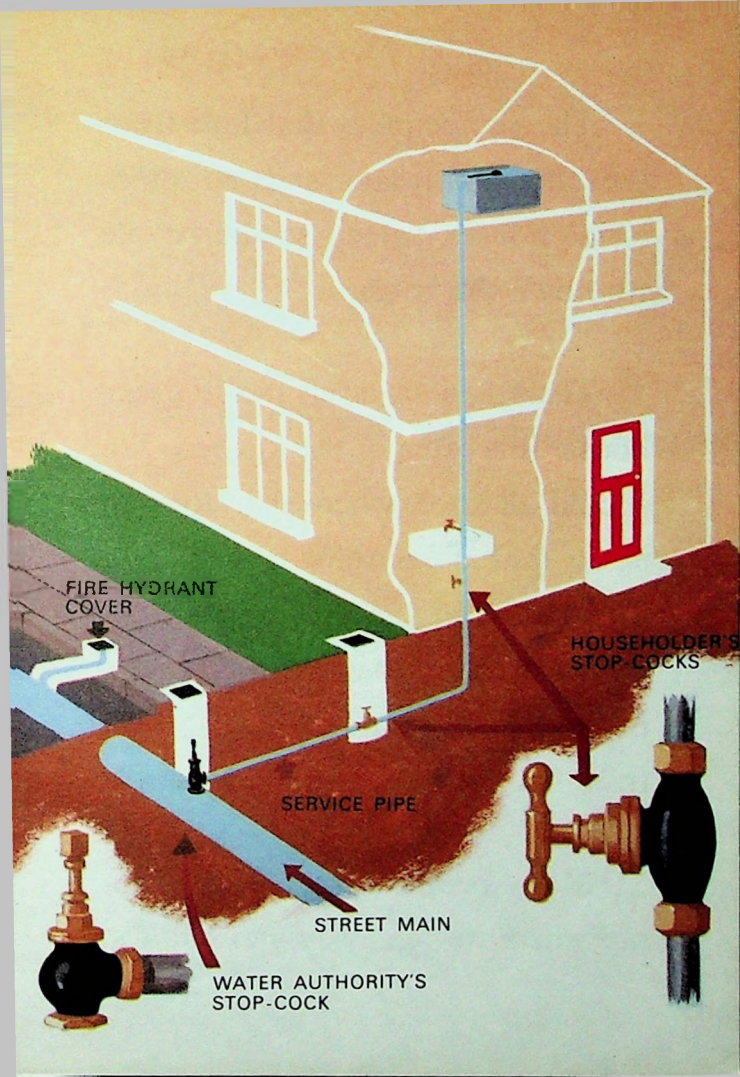
Water stored in these high places can then run through smaller main pipes without needing to be pumped.

All water pipes have stop-valves in them so that the water can be turned off for pipe repairs. Fire hydrants are fixed in the pipes, in case the firemen need to fasten their hose-pipes to the water supply.



Small water mains branch off from the large water mains or from small storage reservoirs. These smaller mains run underground along every street and road in our towns. From these street mains, even smaller pipes take water into every house.

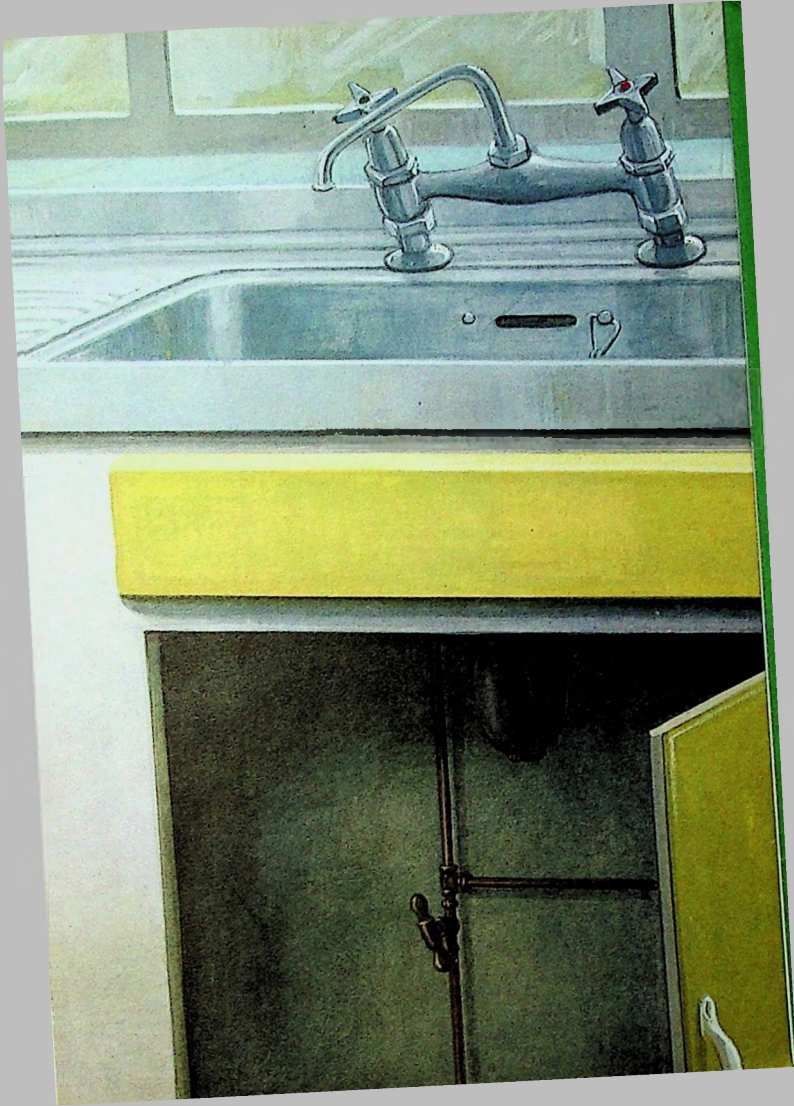
You have all seen the little square lids set in the pavement outside houses. These lids cover the outside stop-taps. Men from the water department have special keys which fit the stop-taps. The men can use their keys to stop water flowing from the water main to any house, when repairs are needed.



The service pipes that lead from the street stop-tap, and all pipes inside houses, belong to the people who own the houses.

There is a stop-tap inside every house. It is often in the kitchen. We should all know where this stop-tap is, so that if anything goes wrong with the water supply in our homes we can turn off the water. By doing this, we may be able to stop water from flooding through the house.

Many people turn off the stop-tap when they go away on holidays.



When water freezes it takes up more space. It cannot do this in a pipe without bursting the pipe. Therefore pipes that might freeze should be covered, or 'lagged'.

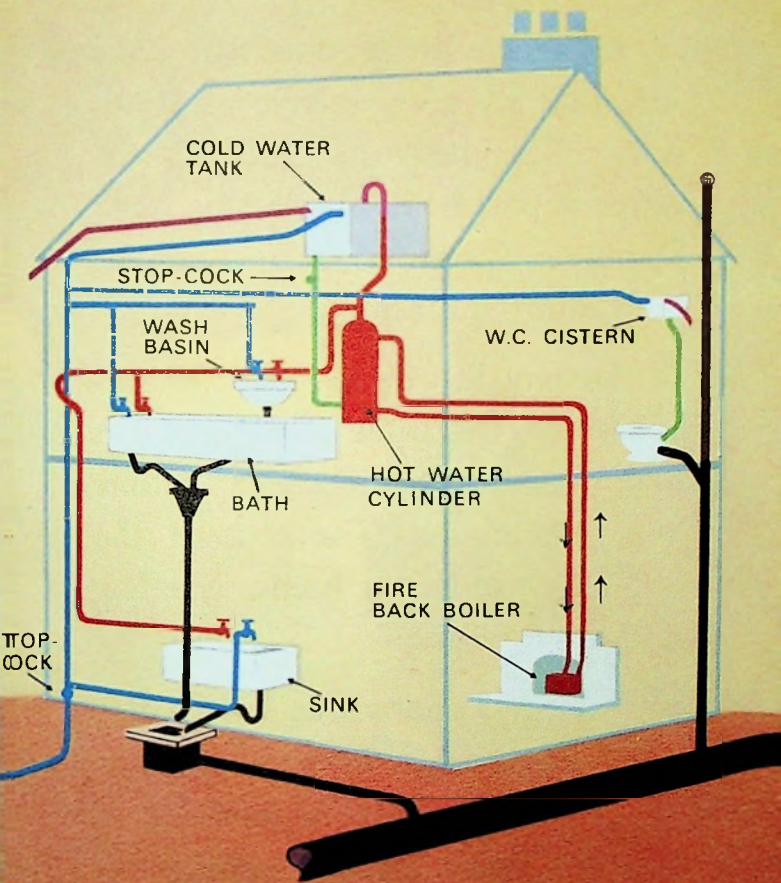
In newly-built houses, the builders should do this but, in old houses, water pipes sometimes burst in frosty weather. People know that pipes are frozen when no water flows or the toilets will not flush.

When the thaw comes, plumbers have to mend the burst pipes. Plastic pipes are being tried in some houses, as they stretch and do not burst easily.



In most houses there are two sets of water pipes. The cold water pipe carries water to the cold water tap in the kitchen. It also goes to the cold water taps in the bathroom and to the toilet. The pipe also takes water to the storage tank for the hot water system.

In some houses a boiler is at the back of the fireplace. From the boiler the water is piped to a hot water storage cylinder and from there to the hot water taps. This is kept full from the cold water tank.



HOT

WASTE

COLD (from main)

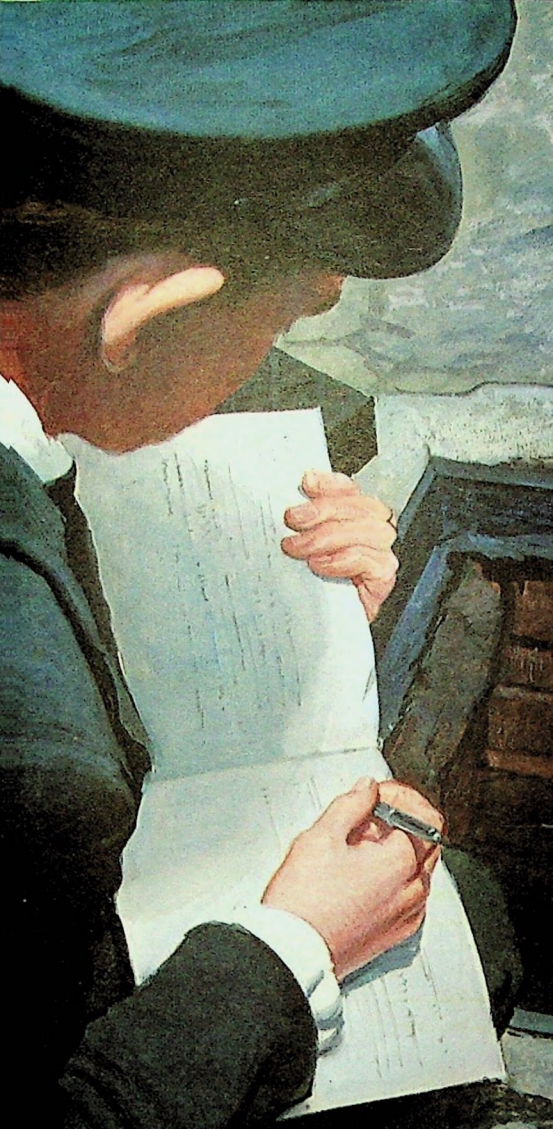
OVERFLOW

COLD (from tank or cistern)

It takes a lot of money to make sure that we always have plenty of water. The men who work for the water department have to be paid. Dams and reservoirs have to be built and pipes bought.

To pay for these, every householder pays a water rate. People in large houses pay more than people in small houses. The cost of the water we use in our homes is a few shillings a week.

Factories and works have water meters to measure how much water they use. This water is paid for at a special price for every thousand gallons.





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- 1 *Electricity*
 - 2 *Gas*
 - 3 *Water Supply*
-

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